Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH Date Report Requested: 10/20/2014 AVERAGE SEVERITY GRADES[b]

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

Lab: BAT

C88148B C Number:

Lock Date: 10/02/2001

Cage Range: ΑII

Date Range: ΑII

Reasons For Removal: ΑII

Removal Date Range: ΑII

Treatment Groups: ΑII

Study Gender: Both

PWG Approval Date NONE

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

HSD Rat MALE	0 MG/KG	0.1 MG/KG	0.3 MG/KG	1.0 MG/KG	3.0 MG/KG	10.0 MG/KG
Disposition Summary						
Animals Initially In Study	10	10	10	10	10	10
Early Deaths						
Survivors						
Terminal Sacrifice	10	10	10	10	10	10
Animals Examined Microscopically	10	10	10	10	10	10
ALIMENTARY SYSTEM						
Intestine Small, Duodenum	(10)	(0)	(0)	(0)	(0)	(0)
Liver	(10)	(10)	(10)	(10)	(10)	(10)
Bile Duct, Hyperplasia	5 [1.0]	6 [1.0]	6 [1.0]	9 [1.0]	9 [1.0]	8 [1.0]
Clear Cell Focus		1	3	1	1 [1.0]	
Fatty Change					6 [1.2]	8 [1.0]
Hematopoietic Cell Proliferation	2 [1.0]	2 [1.0]	2 [1.0]	2 [1.0]	9 [1.0]	10 [1.0]
Hepatocyte, Hypertrophy			2 [1.0]	5 [1.2]	7 [1.3]	10 [1.5]
Infiltration Cellular, Mixed Cell	8 [1.0]	8 [1.0]	9 [1.0]	10 [1.0]	10 [1.0]	10 [1.0]
Necrosis	1 [1.0]	2 [1.0]	2 [1.0]	1 [1.0]	1 [1.0]	2 [1.0]
Vacuolization Cytoplasmic, Focal			1 [1.0]			
Pancreas	(10)	(0)	(0)	(0)	(0)	(0)
Stomach, Forestomach	(10)	(0)	(0)	(0)	(0)	(0)
Hyperplasia, Squamous						
Tongue	(10)	(0)	(0)	(0)	(0)	(0)
CARDIOVASCULAR SYSTEM						
None						
ENDOCRINE SYSTEM						
Adrenal Cortex	(10)	(0)	(0)	(0)	(0)	(0)
Hypertrophy	2 [1.5]					
Adrenal Medulla	(10)	(0)	(0)	(0)	(0)	(0)

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

HSD Rat MALE	0 MG/KG	0.1 MG/KG	0.3 MG/KG	1.0 MG/KG	3.0 MG/KG	10.0 MG/K
Pituitary Gland	(10)	(0)	(0)	(0)	(0)	(0)
Cyst	3 [1.0]					
Thyroid Gland	(10)	(0)	(0)	(0)	(0)	(0)
Ultimobranchial Cyst	5 [1.0]					
GENERAL BODY SYSTEM						
None						
GENITAL SYSTEM						
None						
HEMATOPOIETIC SYSTEM						
Spleen	(10)	(10)	(10)	(10)	(10)	(10)
Hematopoietic Cell Proliferation	2 [1.0]	, ,	2 [1.5]	3 [1.0]	4 [1.0]	9 [1.3]
Infiltration Cellular, Polymorphnuclr				1 [1.0]		
Thymus	(9)	(10)	(10)	(10)	(10)	(10)
Atrophy	1 [1.0]	1 [1.0]	3 [1.0]	1 [1.0]	4 [1.0]	7 [1.0]
INTEGUMENTARY SYSTEM						
Mammary Gland	(10)	(0)	(0)	(0)	(0)	(0)
Skin	(10)	(0)	(0)	(0)	(0)	(0)
MUSCULOSKELETAL SYSTEM						
None						
NERVOUS SYSTEM						
None						
RESPIRATORY SYSTEM						
Lung	(10)	(10)	(9)	(10)	(10)	(10)
Alveolar Epith, Metaplasia, Bronchiolar	2 [1.0]		3 [1.0]	3 [1.0]	3 [1.0]	8 [1.0]
Alveolus, Hyperplasia, Focal						1 [3.0]
Alveolus, Infiltration Cellular, Histiocyte	1 [1.0]					

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

Lab: BAT

HSD Rat MALE	0 MG/KG	0.1 MG/KG	0.3 MG/KG	1.0 MG/KG	3.0 MG/KG	10.0 MG/KG
Infiltration Cellular, Histiocyte			3 [1.0]	2 [1.0]	1 [1.0]	3 [1.3]
Inflammation, Granulomatous, Focal				1 [1.0]		
Interstitium, Infiltration Cellular, Mononuclear Cl	1 [1.0]	3 [1.0]	3 [1.0]	5 [1.0]	5 [1.0]	9 [1.0]
Mineralization						
Nose	(10)	(0)	(0)	(0)	(0)	(0)
Nerve, Degeneration	3 [1.3]					
Respirat Epith, Hyperplasia	1 [1.0]					
Respirat Epith, Inflammation	1 [1.0]					
Squam Epithel, Inflammation	4 [1.3]					

SPECIAL SENSES SYSTEM

None

URINARY SYSTEM

None

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

HSD Rat MALE	30.0 MG/KG	100.00 MG/KG
Disposition Summary		
Animals Initially In Study Early Deaths Survivors	10	10
Terminal Sacrifice	10	10
Animals Examined Microscopically	10	10
ALIMENTARY SYSTEM		
Intestine Small, Duodenum	(0)	(10)
Liver	(10)	(10)
Bile Duct, Hyperplasia	7 [1.0]	5 [1.0]
Clear Cell Focus		
Fatty Change	10 [1.0]	9 [1.3]
Hematopoietic Cell Proliferation	10 [1.0]	10 [1.0]
Hepatocyte, Hypertrophy	10 [2.3]	9 [2.4]
Infiltration Cellular, Mixed Cell	10 [1.0]	9 [1.2]
Necrosis		
Vacuolization Cytoplasmic, Focal		
Pancreas	(0)	(10)
Stomach, Forestomach	(0)	(10)
Hyperplasia, Squamous		1 [1.0]
Tongue	(0)	(10)
CARDIOVASCULAR SYSTEM		
None		
ENDOCRINE SYSTEM		
Adrenal Cortex	(0)	(10)
Hypertrophy	\ - <i>I</i>	1 [1.0]
Adrenal Medulla	(0)	(10)

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

HSD Rat MALE	30.0 MG/KG	100.00 MG/KG
Pituitary Gland	(0)	(10)
Cyst		
Thyroid Gland	(0)	(10)
Ultimobranchial Cyst		3 [1.0]
GENERAL BODY SYSTEM		
None		
GENITAL SYSTEM		
None		
HEMATOPOIETIC SYSTEM		
Spleen	(10)	(9)
Hematopoietic Cell Proliferation	10 [1.5]	8 [1.0]
Infiltration Cellular, Polymorphnuclr		
Thymus	(10)	(8)
Atrophy	10 [1.2]	6 [1.0]
INTEGUMENTARY SYSTEM		
Mammary Gland	(0)	(10)
Skin	(0)	(10)
MUSCULOSKELETAL SYSTEM		
None		
NERVOUS SYSTEM		
None		
RESPIRATORY SYSTEM		
Lung	(10)	(10)
Alveolar Epith, Metaplasia, Bronchiolar	8 [1.0]	10 [1.0]
Alveolus, Hyperplasia, Focal	- L - J	1
Alveolus, Infiltration Cellular, Histiocyte		
7.1700130, minitation condian, motiocyto		

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

Lab: BAT

HSD Rat MALE	30.0 MG/KG	100.00 MG/KG
Infiltration Cellular, Histiocyte		
Inflammation, Granulomatous, Focal		
Interstitium, Infiltration Cellular, Mononuclear Cl	10 [1.0]	10 [1.0]
Mineralization	2 [1.0]	
Nose	(0)	(10)
Nerve, Degeneration		1 [1.0]
Respirat Epith, Hyperplasia		
Respirat Epith, Inflammation		1 [1.0]
Squam Epithel, Inflammation		3 [1.0]
SPECIAL SENSES SYSTEM		
OI LOIME CENTOLO O I OI LIVI		

END OF MALE DATA

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH Date Report Requested: 10/20/2014 AVERAGE SEVERITY GRADES[b] Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

Lab: BAT

HSD Rat FEMALE	0 MG/KG	0.1 MG/KG	0.3 MG/KG	1.0 MG/KG	3.0 MG/KG	10.0 MG/KG
Disposition Summary						
Animals Initially In Study	10	10	10	10	10	10
Early Deaths						
Survivors						
Terminal Sacrifice	10	10	10	10	10	10
Animals Examined Microscopically	10	10	10	10	10	10
ALIMENTARY SYSTEM						
Intestine Small, Duodenum	(10)	(0)	(0)	(0)	(0)	(0)
Liver	(10)	(10)	(10)	(10)	(10)	(10)
Bile Duct, Hyperplasia	4 [1.0]	10 [1.0]	9 [1.0]	10 [1.0]	8 [1.0]	10 [1.0]
Clear Cell Focus		1				2
Hematopoietic Cell Proliferation	2 [1.0]	3 [1.0]	2 [1.0]	3 [1.0]	3 [1.3]	9 [1.0]
Hepatocyte, Hypertrophy					1 [1.0]	6 [1.5]
Infiltration Cellular, Mixed Cell	10 [1.0]	9 [1.0]	10 [1.0]	10 [1.0]	8 [1.0]	10 [1.0]
Mixed Cell Focus						
Necrosis		1 [1.0]		1 [1.0]		
Oral Mucosa	(0)	(0)	(0)	(0)	(0)	(0)
Gingival, Inflammation						
Pancreas	(10)	(0)	(0)	(0)	(0)	(0)
Acinus, Atrophy						
Acinus, Inflammation						
Basophilic Focus						
Stomach, Forestomach	(10)	(0)	(0)	(0)	(0)	(0)
Diverticulum	1					
Epithelium, Hyperplasia, Focal	1 [1.0]					
Tongue	(10)	(0)	(0)	(0)	(0)	(0)

CARDIOVASCULAR SYSTEM

None

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

HSD Rat FEMALE	0 MG/KG	0.1 MG/KG	0.3 MG/KG	1.0 MG/KG	3.0 MG/KG	10.0 MG/K
ENDOCRINE SYSTEM						
Adrenal Cortex	(10)	(0)	(2)	(0)	(0)	(0)
Hyperplasia						
Hypertrophy	2 [1.5]					
Adrenal Medulla	(10)	(0)	(0)	(0)	(0)	(0)
Pituitary Gland	(10)	(0)	(0)	(0)	(0)	(0)
Thyroid Gland	(10)	(0)	(0)	(0)	(0)	(0)
Ultimobranchial Cyst	2 [1.0]					
GENERAL BODY SYSTEM						
None						
GENITAL SYSTEM						
Ovary	(10)	(0)	(0)	(0)	(0)	(0)
Uterus	(10)	(0)	(1)	(0)	(0)	(0)
Atrophy			1 [4.0]			
Endometrium, Hyperplasia, Cystic	1 [1.0]					
Vagina	(10)	(0)	(0)	(0)	(0)	(0)
HEMATOPOIETIC SYSTEM						
Spleen	(10)	(2)	(2)	(2)	(2)	(10)
Fibrosis						
Hematopoietic Cell Proliferation	3 [1.7]	2 [2.0]	2 [1.5]	2 [1.5]	1 [3.0]	5 [1.0]
Pigmentation, Hemosiderin			1 [1.0]		1 [1.0]	4 [1.0]
Thymus	(10)	(10)	(10)	(10)	(10)	(10)
Atrophy	` '	2 [1.0]	8 [1.0]	7 [1.0]	6 [1.0]	8 [1.0]
Cyst					1 [1.0]	1 [1.0]
Hyperplasia, Squamous						
INTEGUMENTARY SYSTEM						
Mammary Gland	(9)	(0)	(0)	(0)	(0)	(0)

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:40

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:40

First Dose M/F: NA / NA

HSD Rat FEMALE	0 MG/KG	0.1 MG/KG	0.3 MG/KG	1.0 MG/KG	3.0 MG/KG	10.0 MG/KC
Skin	(10)	(0)	(0)	(0)	(0)	(0)
Subcut Tiss, Inflammation, Suppurative	1 [2.0]					
MUSCULOSKELETAL SYSTEM None						
NERVOUS SYSTEM None						
RESPIRATORY SYSTEM						
Lung	(10)	(10)	(10)	(10)	(10)	(9)
Alveolar Epith, Metaplasia, Bronchiolar	1 [1.0]	2 [1.0]		1 [1.0]		
Fibrosis, Focal				1 [1.0]		
Infiltration Cellular, Histiocyte		2 [1.0]	3 [1.0]	1 [1.0]	1 [1.0]	
Infiltration Cellular, Mononuclear Cl						
Interstitium, Infiltration Cellular, Mononuclear Cl		1 [1.0]	2 [1.0]	2 [1.0]	2 [1.0]	
Perivascular, Infiltration Cellular, Polymorphnuclr	1 [1.0]					
Nose	(10)	(0)	(0)	(0)	(0)	(0)
Nerve, Degeneration	3 [1.0]					
Squam Epithel, Inflammation	1 [1.0]					
SPECIAL SENSES SYSTEM						
Eye	(0)	(1)	(0)	(0)	(2)	(1)
Hemorrhage					1 [2.0]	
Inflammation, Chronic Active		1 [4.0]			1 [4.0]	1 [4.0]
URINARY SYSTEM						
None						

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:41

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:41

First Dose M/F: NA / NA

Lab: BAT

HSD Rat FEMALE	30.0 MG/KG	100.0 MG/KG
Disposition Summary		
Animals Initially In Study	10	10
Early Deaths		
Survivors		
Terminal Sacrifice	10	10
Animals Examined Microscopically	10	10
ALIMENTARY SYSTEM		
Intestine Small, Duodenum	(0)	(10)
Liver	(10)	(10)
Bile Duct, Hyperplasia	7 [1.0]	5 [1.0]
Clear Cell Focus		2
Hematopoietic Cell Proliferation	10 [1.0]	10 [1.0]
Hepatocyte, Hypertrophy	6 [1.3]	5 [1.2]
Infiltration Cellular, Mixed Cell	10 [1.0]	9 [1.0]
Mixed Cell Focus	1	
Necrosis		
Oral Mucosa	(0)	(2)
Gingival, Inflammation		2 [1.0]
Pancreas	(0)	(10)
Acinus, Atrophy		2 [1.0]
Acinus, Inflammation		1 [1.0]
Basophilic Focus		1 [1.0]
Stomach, Forestomach	(0)	(10)
Diverticulum		
Epithelium, Hyperplasia, Focal		
Tongue	(0)	(10)

CARDIOVASCULAR SYSTEM

None

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:41

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Lab: BAT

Time Report Requested: 07:48:41

First Dose M/F: NA / NA

HSD Rat FEMALE	30.0 MG/KG	100.0 MG/KG
ENDOCRINE SYSTEM		
Adrenal Cortex	(1)	(10)
Hyperplasia		1 [1.0]
Hypertrophy		
Adrenal Medulla	(0)	(10)
Pituitary Gland	(0)	(10)
Thyroid Gland	(0)	(10)
Ultimobranchial Cyst		2 [2.0]
GENERAL BODY SYSTEM		
None		
GENITAL SYSTEM		
Ovary	(0)	(10)
Uterus	(0)	(10)
Atrophy		
Endometrium, Hyperplasia, Cystic		
Vagina	(0)	(10)
HEMATOPOIETIC SYSTEM		
Spleen	(10)	(10)
Fibrosis		1 [1.0]
Hematopoietic Cell Proliferation	2 [1.5]	
Pigmentation, Hemosiderin	7 [1.0]	7 [1.0]
Thymus	(10)	(10)
Atrophy	9 [1.1]	7 [1.3]
Cyst	1 [1.0]	
Hyperplasia, Squamous	1 [1.0]	
INTEGUMENTARY SYSTEM		
Mammary Gland	(0)	(10)

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)

Test Type: 90-DAY

Species/Strain: Rat/HSD

Route: GAVAGE

P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH AVERAGE SEVERITY GRADES[b] Date Report Requested: 10/20/2014 Time Report Requested: 07:48:41

Test Compound: 3,3',4,4'-Tetrachloroazobenzene

CAS Number: 14047-09-7

Time Report Requested: 07:48:41

First Dose M/F: NA / NA

HSD Rat FEMALE	30.0 MG/KG	100.0 MG/KG
Skin	(0)	(10)
Subcut Tiss, Inflammation, Suppurative		
MUSCULOSKELETAL SYSTEM		
None		
NERVOUS SYSTEM		
None		
RESPIRATORY SYSTEM		
Lung	(9)	(10)
Alveolar Epith, Metaplasia, Bronchiolar	3 [1.0]	3 [1.0]
Fibrosis, Focal		
Infiltration Cellular, Histiocyte		4 [1.3]
Infiltration Cellular, Mononuclear Cl		1 [1.0]
Interstitium, Infiltration Cellular, Mononuclear Cl	2 [1.0]	6 [1.2]
Perivascular, Infiltration Cellular, Polymorphnuclr		
Nose	(0)	(10)
Nerve, Degeneration		2 [1.5]
Squam Epithel, Inflammation		4 [1.0]
SPECIAL SENSES SYSTEM		
Eye	(0)	(0)
Hemorrhage		
Inflammation, Chronic Active		
URINARY SYSTEM		
None		

^{**} END OF REPORT **

a - Number of animals examined microscopically at site and number of animals with lesion

b - Average severity grade (1-minimal; 2-mild; 3-moderate; 4-marked)